Figure F.7. Rotor-based PSC Enclosure (Top View)

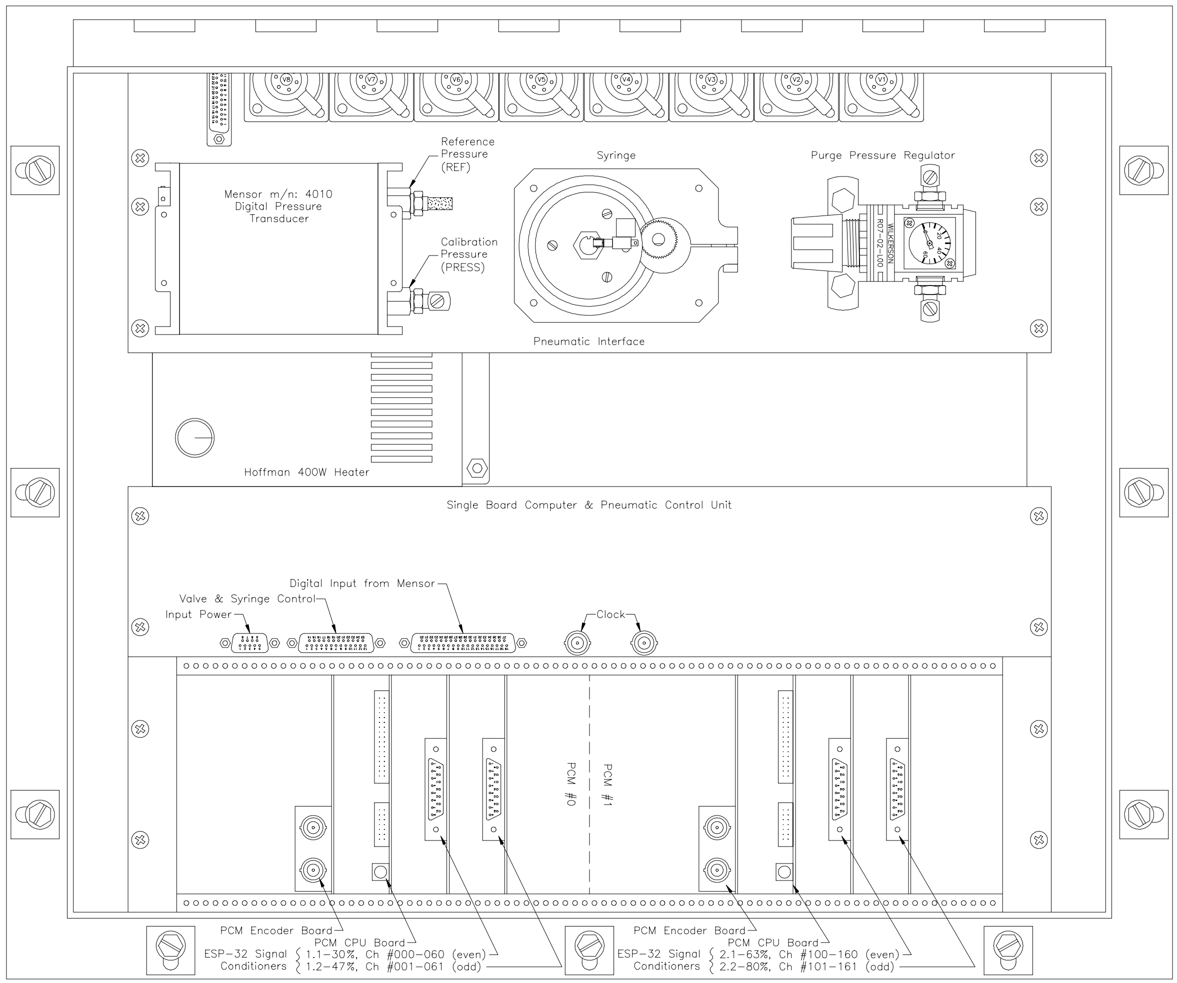


Figure F.8. Rotor-based PCM Enclosure (Side View)

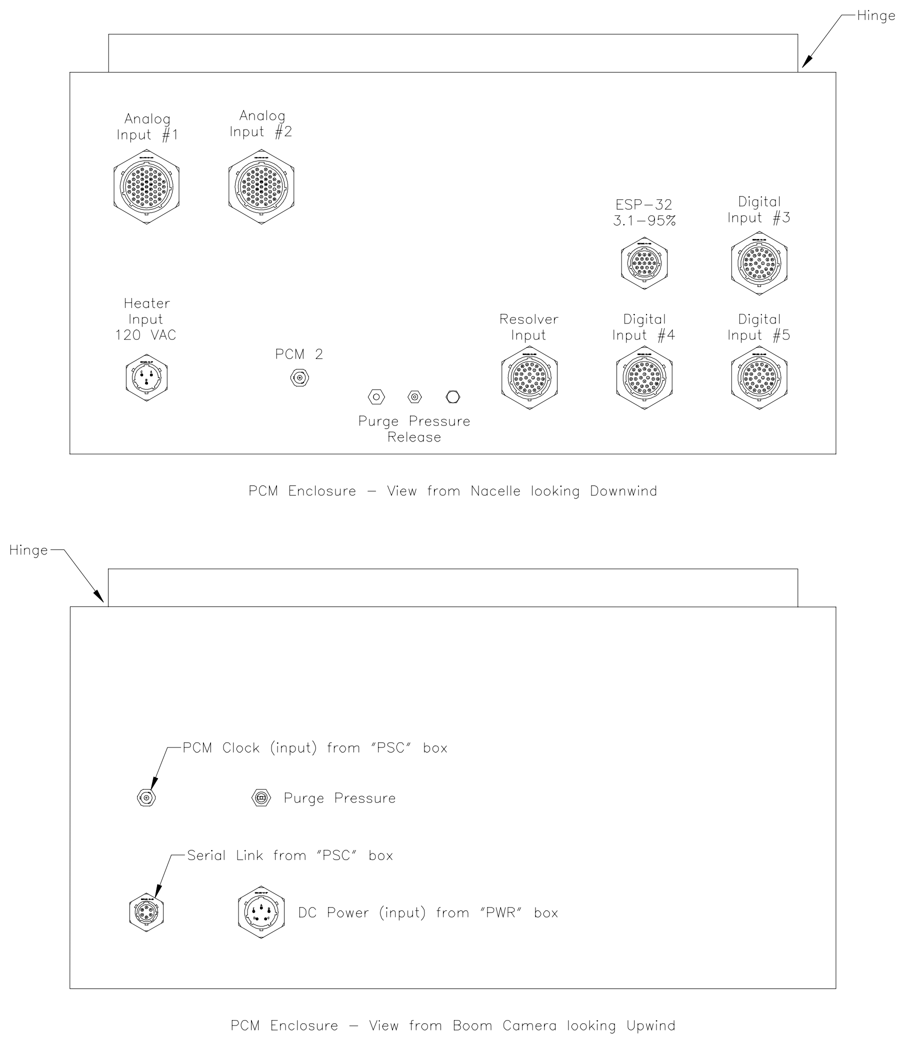


Figure F.9. Ground-based PCM Rack Power

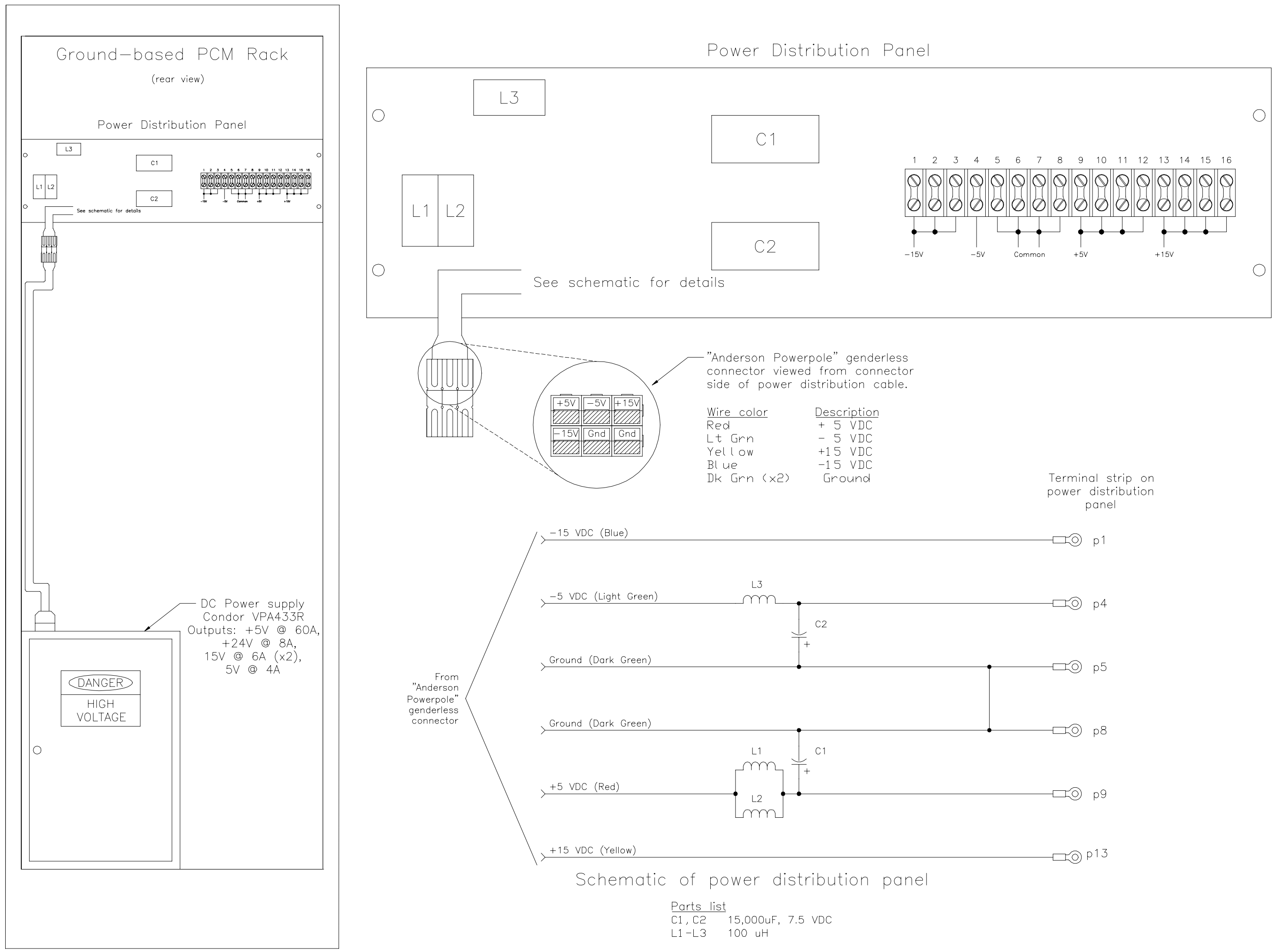


Figure F.10. Ground-based PCM rack I/O

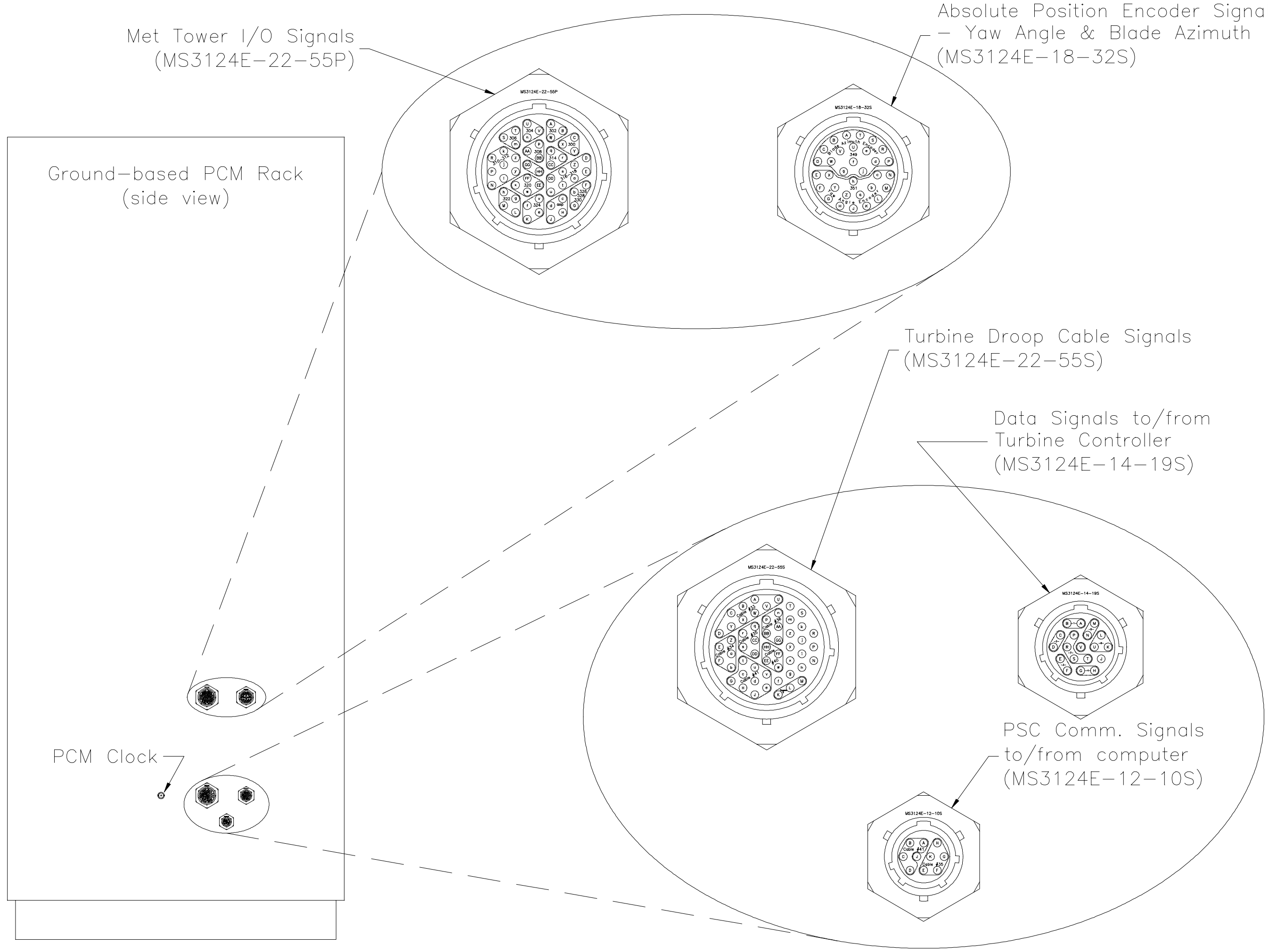


Figure F.11. Aspirator Alarm Panel Schematic

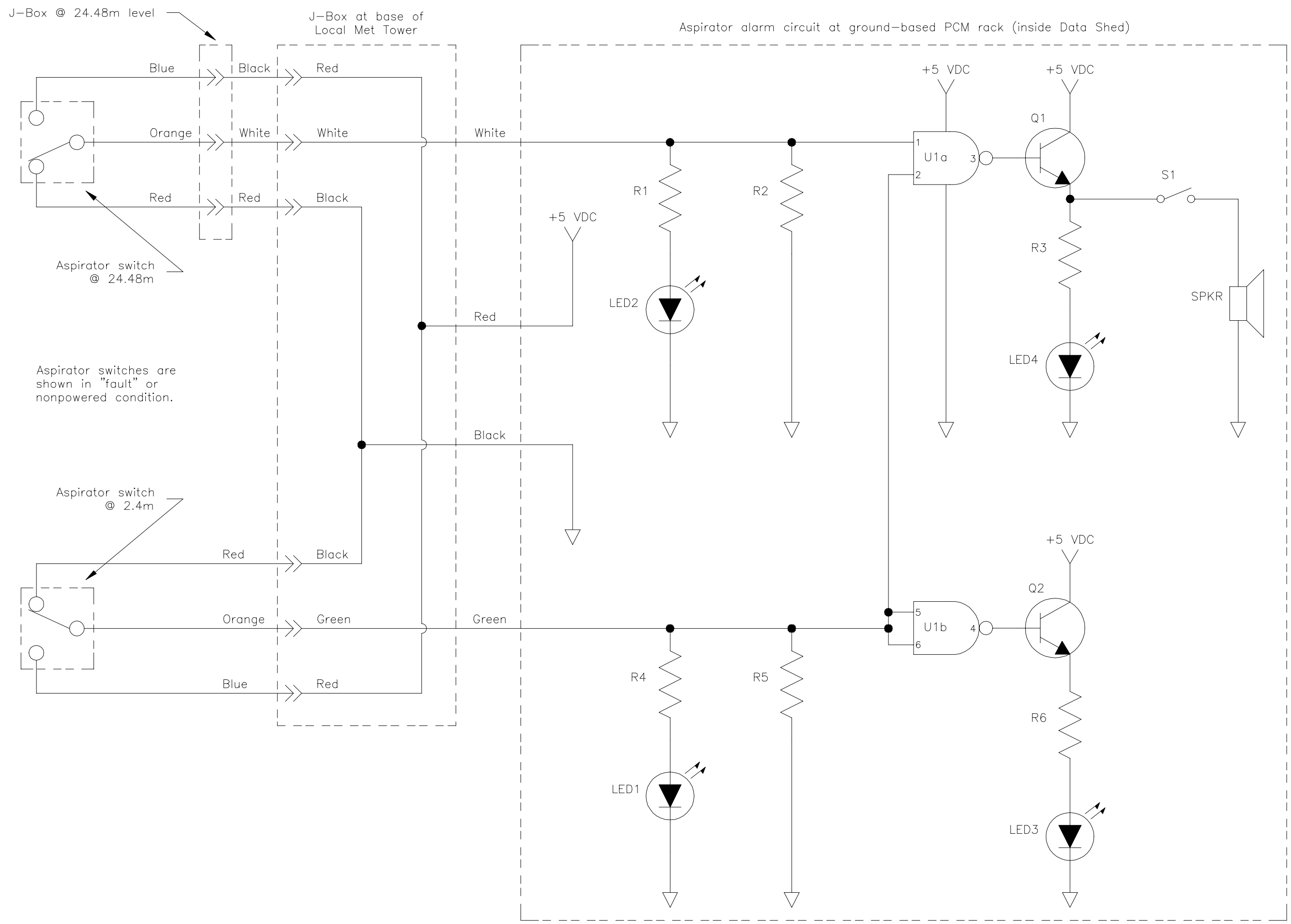
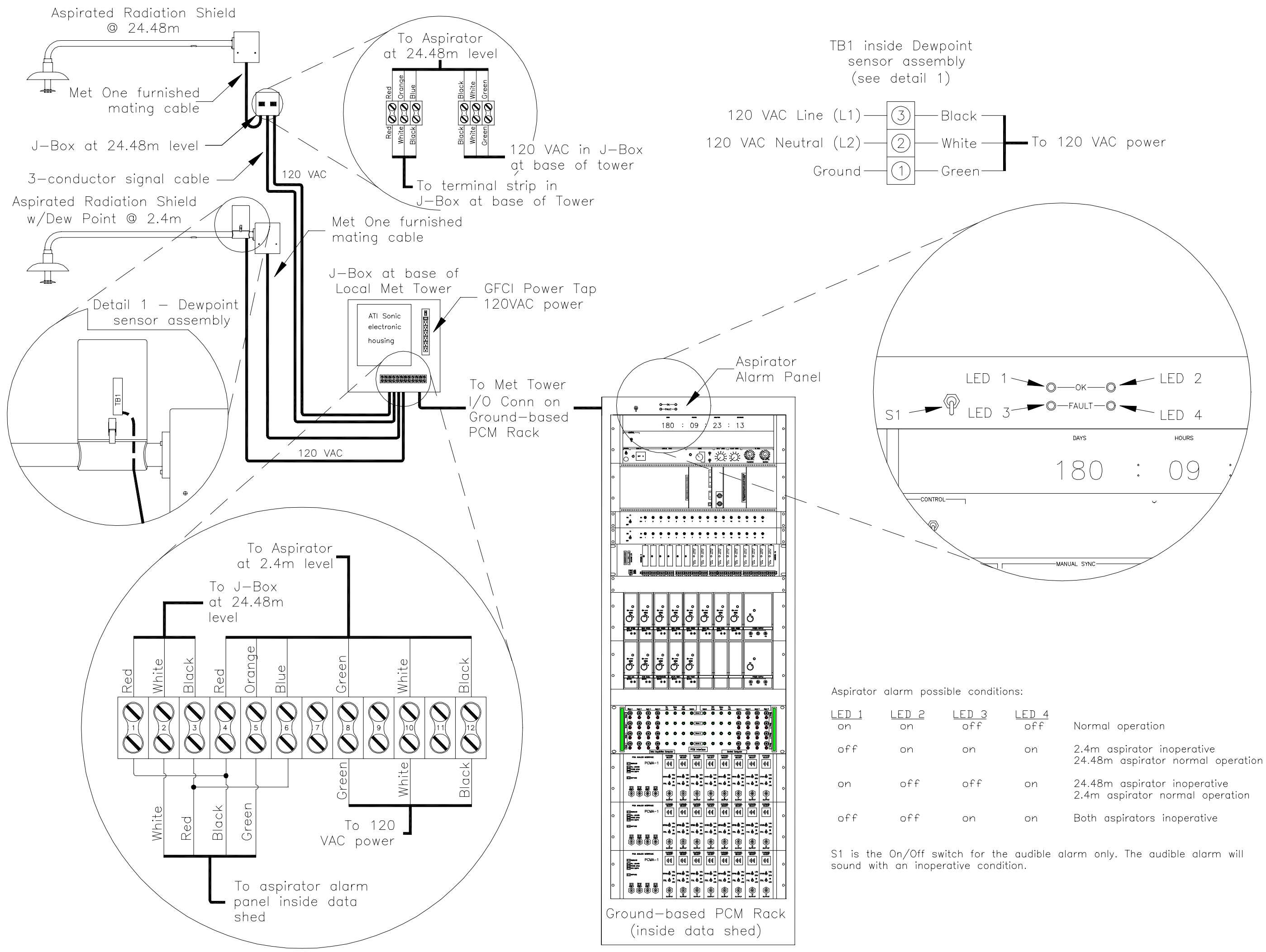


Figure F.12. Aspirator Alarm Panel Wiring

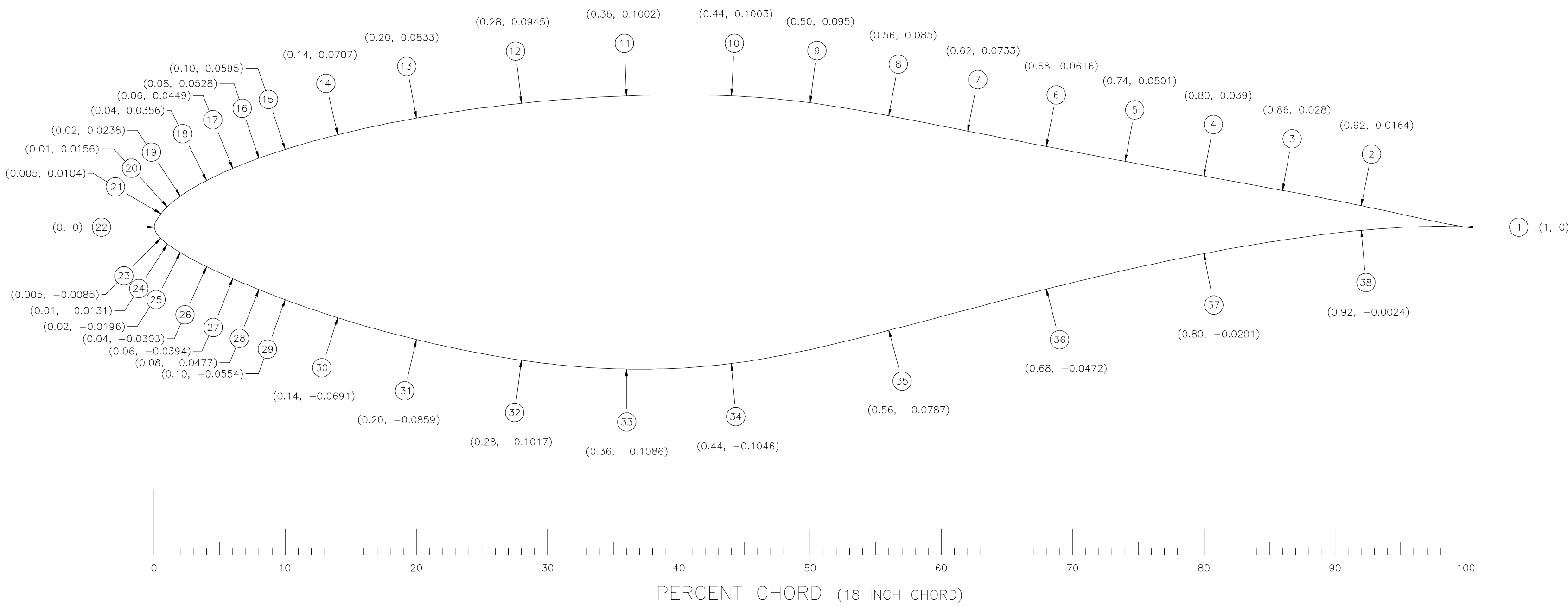


Aspirator alarm possible conditions:

LED 1	LED 2	LED 3	LED 4	
on	on	off	off	Normal operation
off	on	on	on	2.4m aspirator inoperative 24.48m aspirator normal operation
on	off	off	on	24.48m aspirator inoperative 2.4m aspirator normal operation
off	off	on	on	Both aspirators inoperative

S1 is the On/Off switch for the audible alarm only. The audible alarm will sound with an inoperative condition.

Figure F.13. Pressure Tap Layout



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INDEX

The page number of indexed figures is italicized.

NOTES

NOTES

REPORT DOCUMENTATION PAGE

Form Approved
OMB NO. 0704-0188

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE July 1999	3. REPORT TYPE AND DATES COVERED Technical Report

4. TITLE AND SUBTITLE
Unsteady Aerodynamics Experiment Phases II–IV
Test Configurations and Available Data Campaigns

5. FUNDING NUMBERS

6. AUTHOR(S)
D.A. Simms, M.M. Hand, L.J. Fingersh, D.W. Jager

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
National Renewable Energy Laboratory
1617 Cole Blvd.
Golden, CO 80401-3393

8. PERFORMING ORGANIZATION REPORT NUMBER
TP-500-25950

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
National Renewable Energy Laboratory
1617 Cole Blvd.
Golden, CO 80401-3393

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION/AVAILABILITY STATEMENT
National Technical Information Service
U.S. Department of Commerce
5285 Port Royal Road
Springfield, VA 22161

12b. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200 words)*

The main objective of the Unsteady Aerodynamics Experiment is to provide information needed to quantify the full-scale three-dimensional aerodynamic behavior of horizontal axis wind turbines. To accomplish this, an experimental wind turbine configured to meet specific research objectives was assembled and operated at the National Renewable Energy Laboratory (NREL). The turbine was instrumented to characterize rotating blade aerodynamic performance, machine structural responses, and atmospheric inflow conditions. Comprehensive tests were conducted with the turbine operating in an outdoor field environment under diverse conditions. Resulting data are used to validate aerodynamic and structural dynamics models which are an important part of wind turbine design and engineering codes. Improvements in these models are needed to better characterize aerodynamic response in both the steady-state post-stall and dynamic stall regimes.
Much of the effort in the earlier phase of the Unsteady Aerodynamics Experiment focused on developing required data acquisition systems. Complex instrumentation and equipment was needed to meet stringent data requirements while operating under the harsh environmental conditions of a wind turbine rotor. Once the data systems were developed, subsequent phases of experiments were then conducted to collect data for use in answering specific research questions. A description of the experiment configuration used during Phases II - IV of the experiment is contained in this report.

14. SUBJECT TERMS
wind energy, wind turbines, aerodynamics

15. NUMBER OF PAGES

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	UL

NSN 7540-01-280-5500

Standard Form 298 (Rev. 2-89)
Prescribed by ANSI Std. Z39-18
298-102